

Soft Tissue Skin Infections
(STSI) & Community Acquired
Methicillin Resistant

Staphylococcus aureus
(Ca-MRSA)

in Recruits at the Marine Corps
Recruit Depot at Parris Is



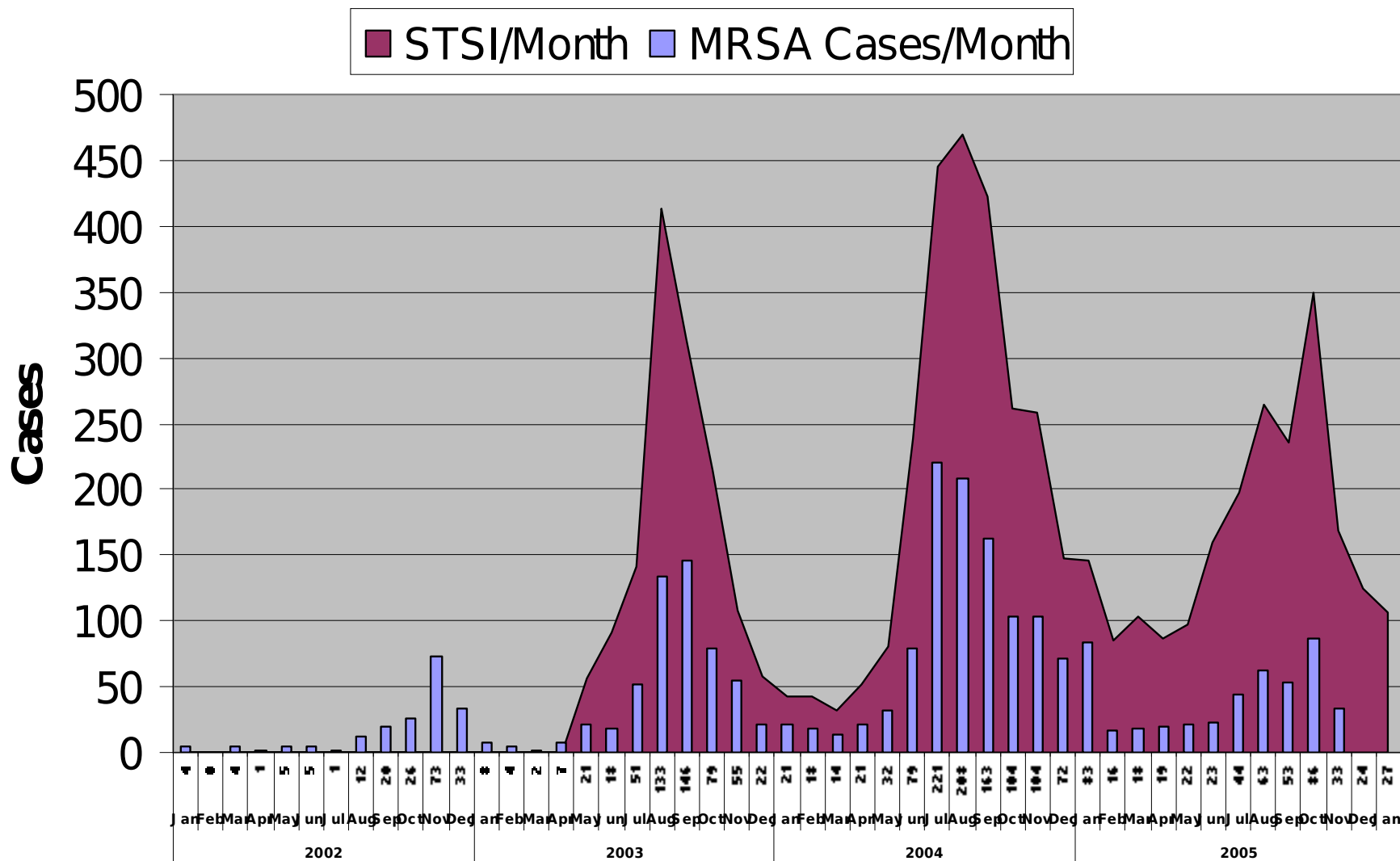
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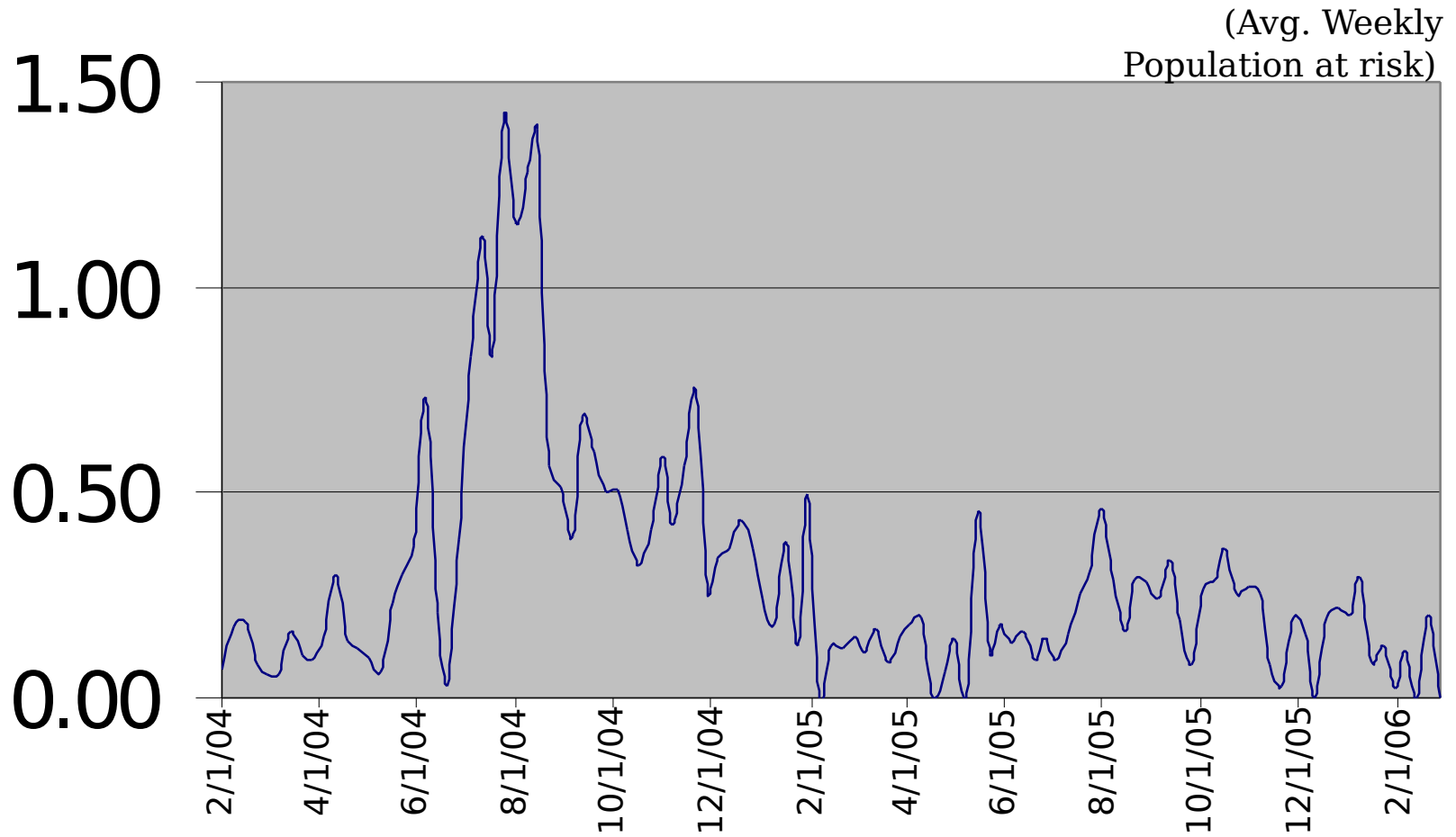


Soft Tissue Skin Infections & Methacilin resistant *Staphylococcal Aureus* **Infections in Marine Recruits at Marine Corps Recruit Depot at Parris Island 2002** **to 2006**



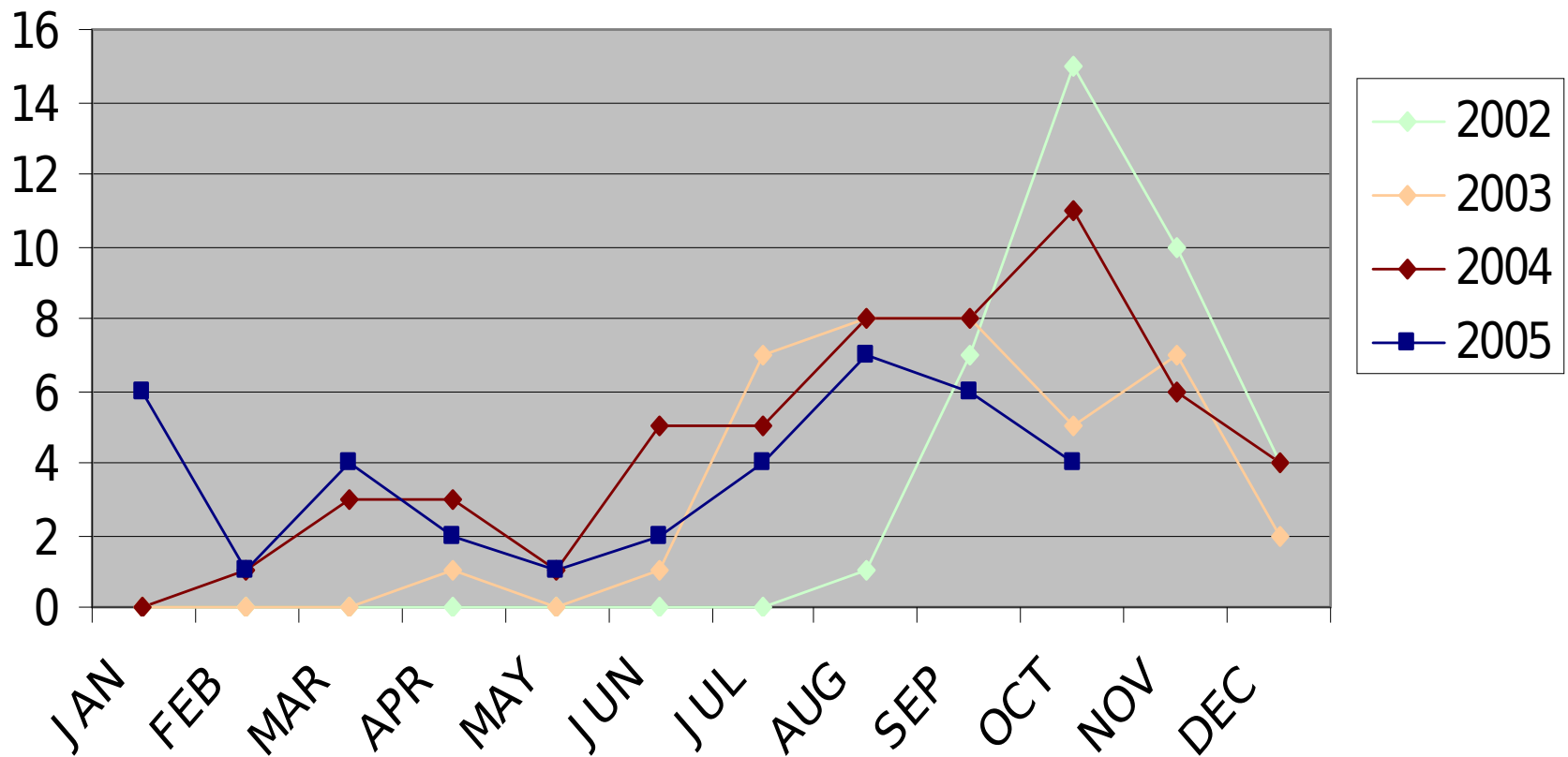
Weekly MRSA Rates

$$\text{Rate} = \frac{\text{Cases} \times 100}{\text{Population at risk}}$$

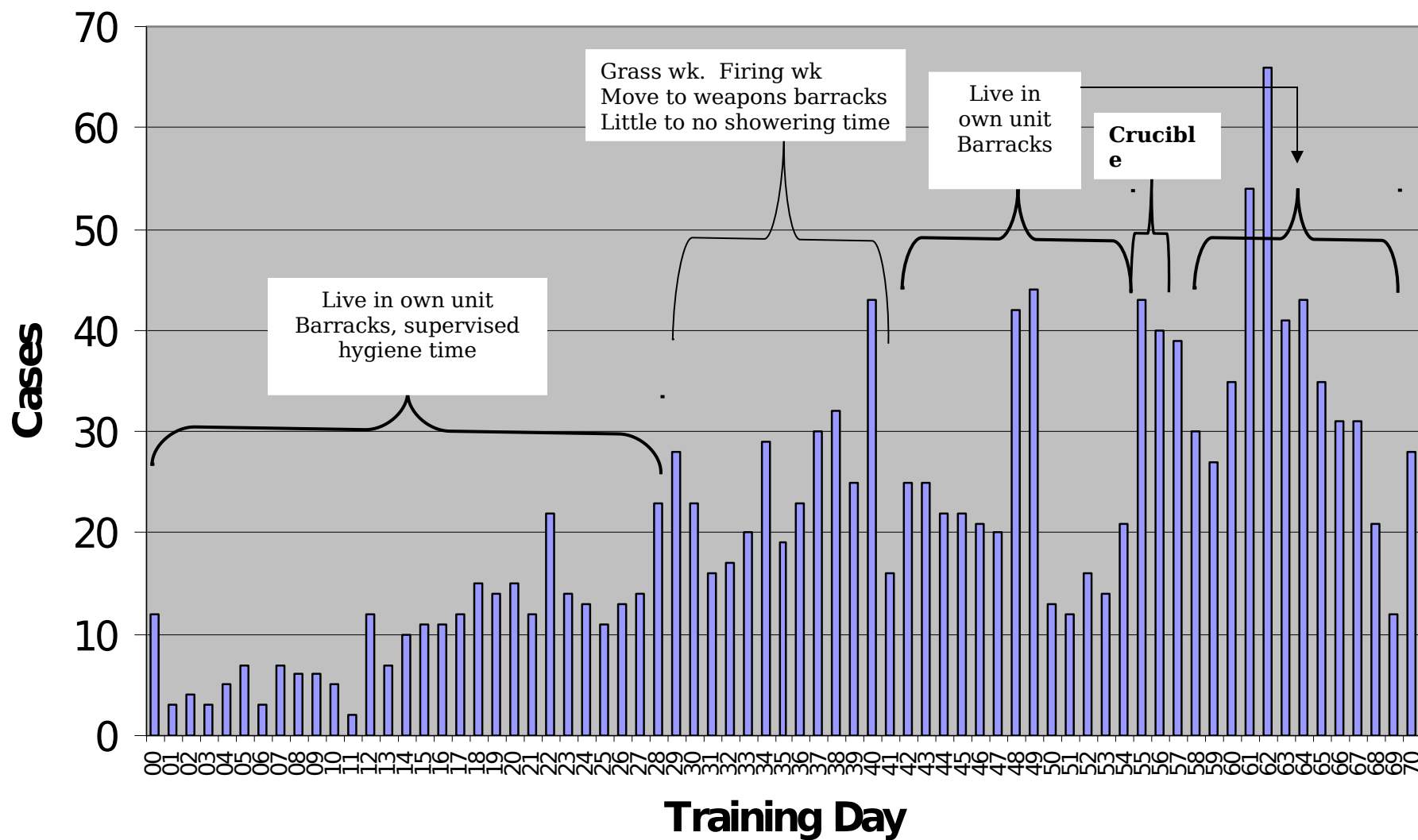


MRSA HOSPITALIZATIONS

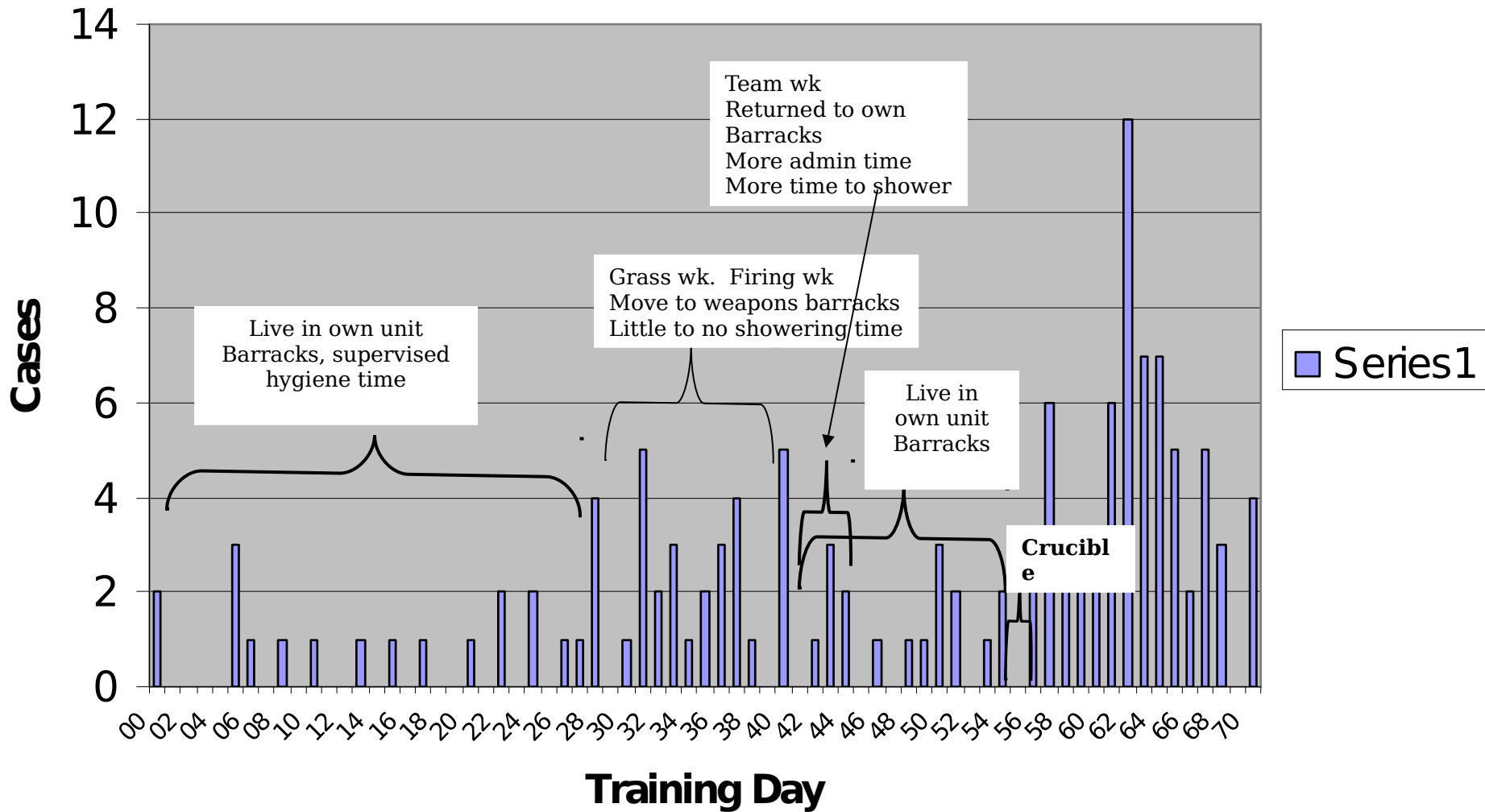
AUGUST 2002 THROUGH JUNE 2005



MRSA: Male Recruits 2002-2004

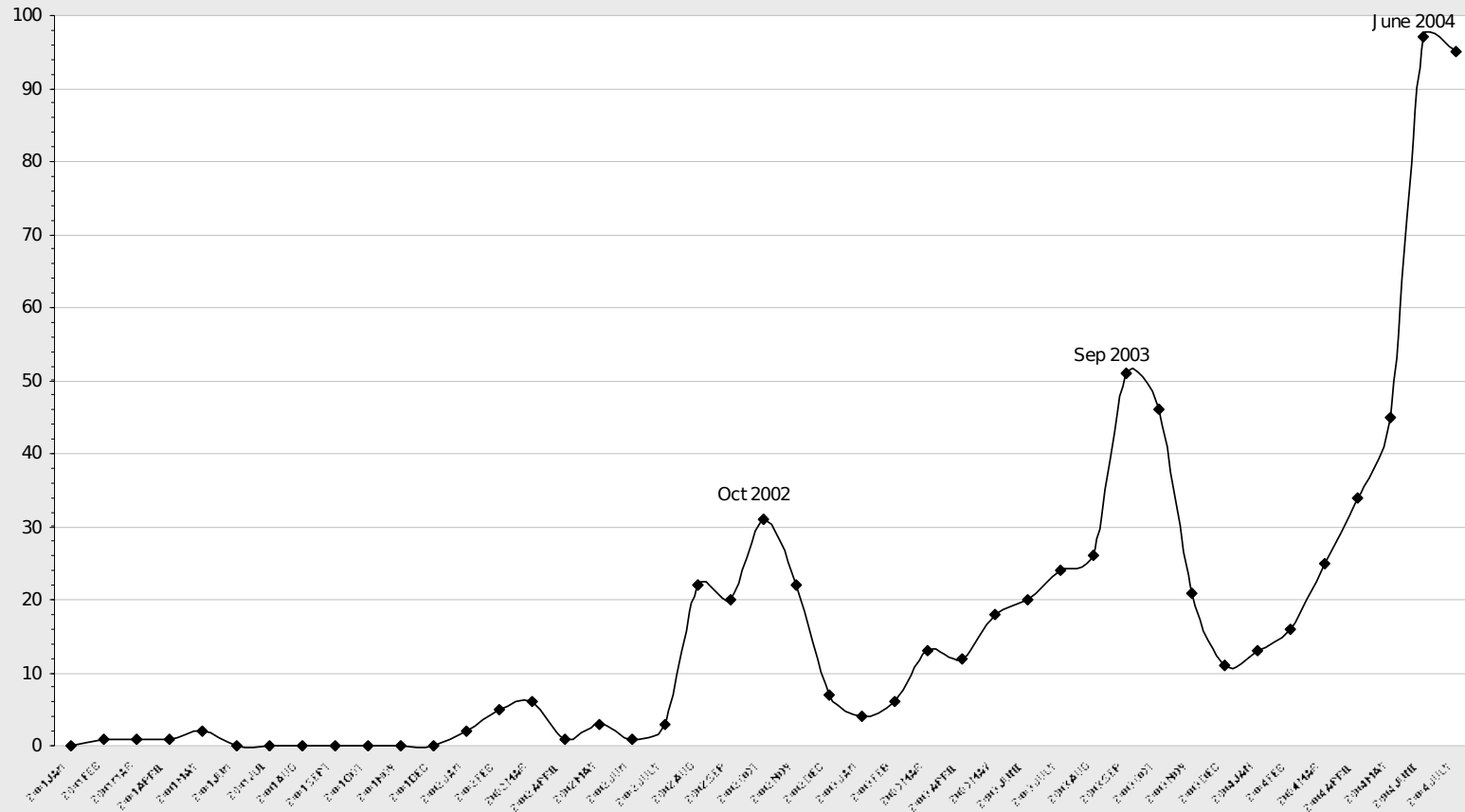


MRSA: Female Recruits 2002-2004

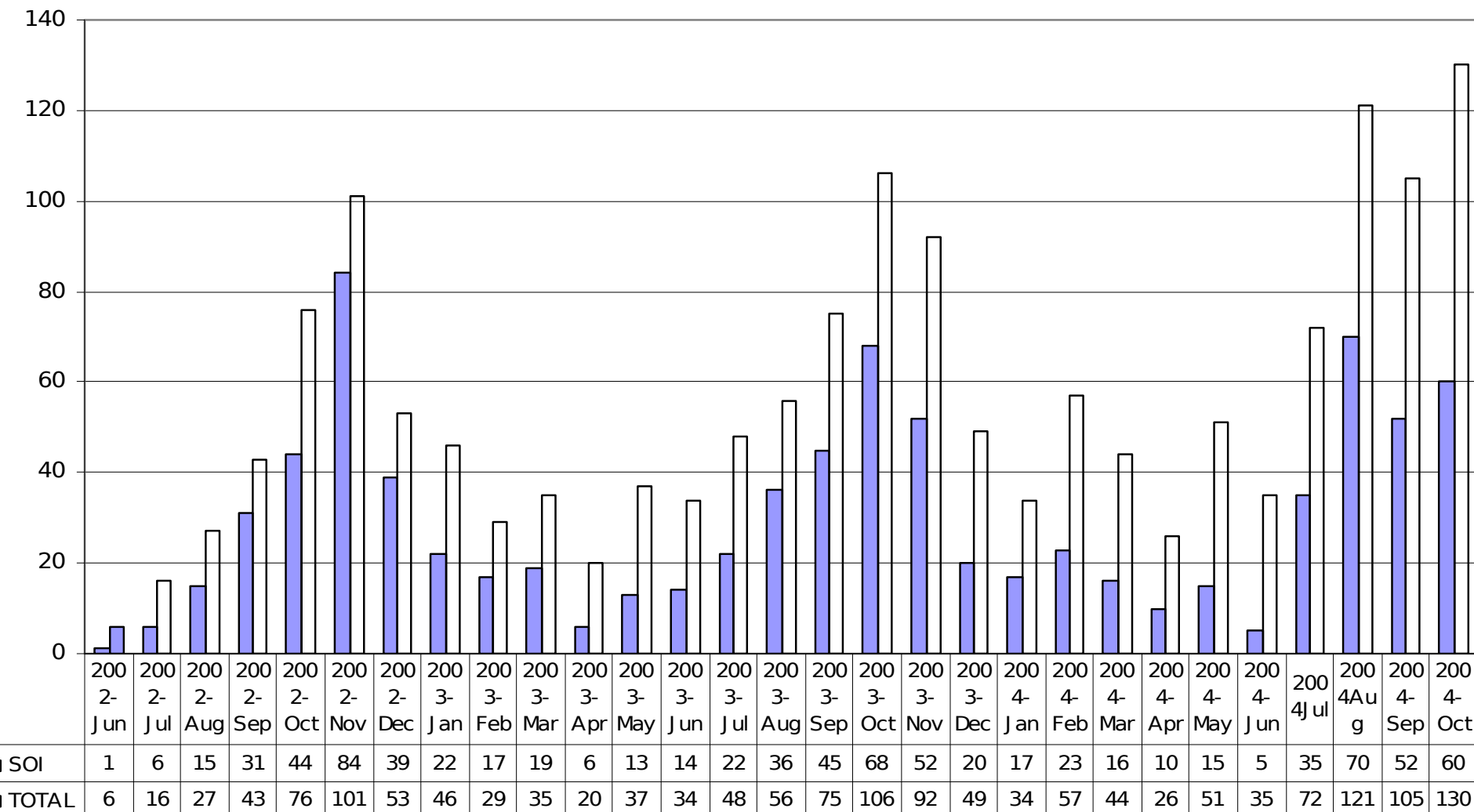


Fort Benning Experience

Epidemic Curve



TOTAL NUMBER OF NHCL MRSA ISOLATES IDENTIFIED AND NUMBER OF MRSA ISOLATES FROM SCHOOL OF INFANTRY (Pts with multiple isolates only counted once.)



Community-acquired Methicillin-resistant *Staphylococcus aureus* among Military Recruits

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Adam Armstrong,‡ and Bruce K. Bohnker†

We report an outbreak of 235 community-acquired methicillin-resistant *Staphylococcus aureus* (MRSA) infections among military recruits. In this unique environment, the close contact between recruits and the physical demands of training may have contributed to the spread of MRSA. Control measures included improved hygiene and aggressive clinical treatment.

Methicillin-resistant *Staphylococcus aureus* (MRSA) was first recognized in the 1960s and has since become a well-known cause of nosocomial infections (1). Recently, MRSA has been reported with increasing frequency outside healthcare settings (2–5). Community-acquired outbreaks have been reported in a variety of populations, including prison inmates (3,4), players of contact sports (6,7), children in daycare (8), and crewmembers of a naval ship (9). These groups do not possess the risk factors traditionally associated with MRSA infection, namely, recent hospitalization, dialysis, residence in a long-term care facility, or intravenous drug use (1,2). We report an outbreak of community-acquired MRSA infections among recruits at a large military training facility in the southeastern United States.

The Study

The training facility where the outbreak occurred had a recruit population that fluctuated from 3,500 to 7,000. A case-patient was defined as a recruit with a clinically recognized skin or soft-tissue infection and a positive MRSA culture from the site of infection. Laboratory records

showed that from October 2000 to July 2002, 47 culture-confirmed MRSA infections occurred among recruits (Figure 1). During this period, the monthly incidence of MRSA did not exceed two cases per 1,000 recruits (Figure 2). However, from August to December 2002, 235 MRSA cases occurred. During the outbreak period, the monthly incidence rates ranged from 4.9 to 11 cases per 1,000 recruits.

Of the case-patients, 209 (89%) were men. This percentage paralleled the overall male recruit population in 2002 (88% male). Although information on the specific age of infected recruits was not available, all recruits at this facility were 17–25 years of age. Most infections occurred on an extremity (73.7%), most commonly the lower leg (16.0%) and the knee (13.9%) (Table).

To investigate what aspects of training might be associated with transmission, cases were sorted by week of training when illness was diagnosed (Figure 3). Data on training week was available for 143 (61%) of the outbreak patients. The rise in cases during weeks 1–5 suggests that transmission increased with time in training. Of the cases, 86% occurred during weeks 6 to 12 but did not seem to be associated with any single event. Moderate increases occurred during weeks 6 and 7 (rifle range training) and week 11, which included the “crucible,” a 54-hour strenuous field exercise and final test before graduation. These weeks include important milestones for recruits, and some may have delayed seeking medical care until after completing these steps.

Medical records from 20 patients were randomly selected and reviewed during the investigation. These patients included 18 men and 2 women, 17–24 years of age. The diagnoses included abscesses (15 patients), cellulitis (2 patients), and folliculitis (3 patients). The antimicrobial agents most commonly prescribed for initial treatment were dicloxacillin (6), levofloxacin (5), and

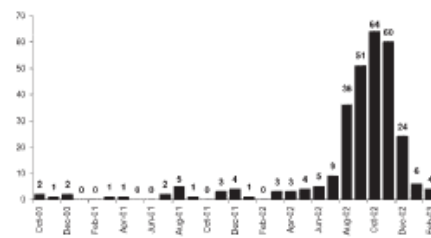


Figure 1. Methicillin-resistant *Staphylococcus aureus* cases in recruits.

*Views expressed are those of the authors and are not approved by or representative of the Bureau of Medicine and Surgery, the Department of the Navy, or the Department of Defense.

- CHCS lab reports & RTR troop strength reports to capture cases,
- Reviewed 20 medical records.
- Performed nasal colonization screening.
- Interviewed medical staff, DIs and recruits.
- Collected and tested 199 Environmental Samples (Barbershop, in-processing center, training pool,

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NEPMU-2 findings

- Most (90%) were male aged 17-25
- Infections mostly (73%) on extremities distal to the thighs or elbows.
- Few to none with Ha-MRSA risk factors.
- Not localized to recruits who had contact with specific DIs, Staff or facilities.
- Infections increased steadily with time in training
- Twenty-four (2.7%) of the 874 staff screened were colonized with MRSA
- Recruit colonization:
 - Initial entry 3.16% of 790
 - Pre-crucible 3.85%
 - Post crucible 9.73%
- Two environmental samples were positive
- Lapses in hygiene were identified
- Providers commonly prescribed dicloxacillin, levofloxacin and ciprofloxacin for STSIs
- Health Care providers were not routinely obtaining bacterial cultures and sensitivities on skin infections.

Associated Factors – Ft Benning

- Close contact
- Extended contact
- Poor personal hygiene
- Recent antibiotic usage
- Physical stress
- Humid environment
- Contact with contaminated object
- Underutilization of health services due to fear of being “recycled” which leads to extended period of untreated contagious lesions
- Misdiagnosis and subsequent prescription of ineffective antibiotics

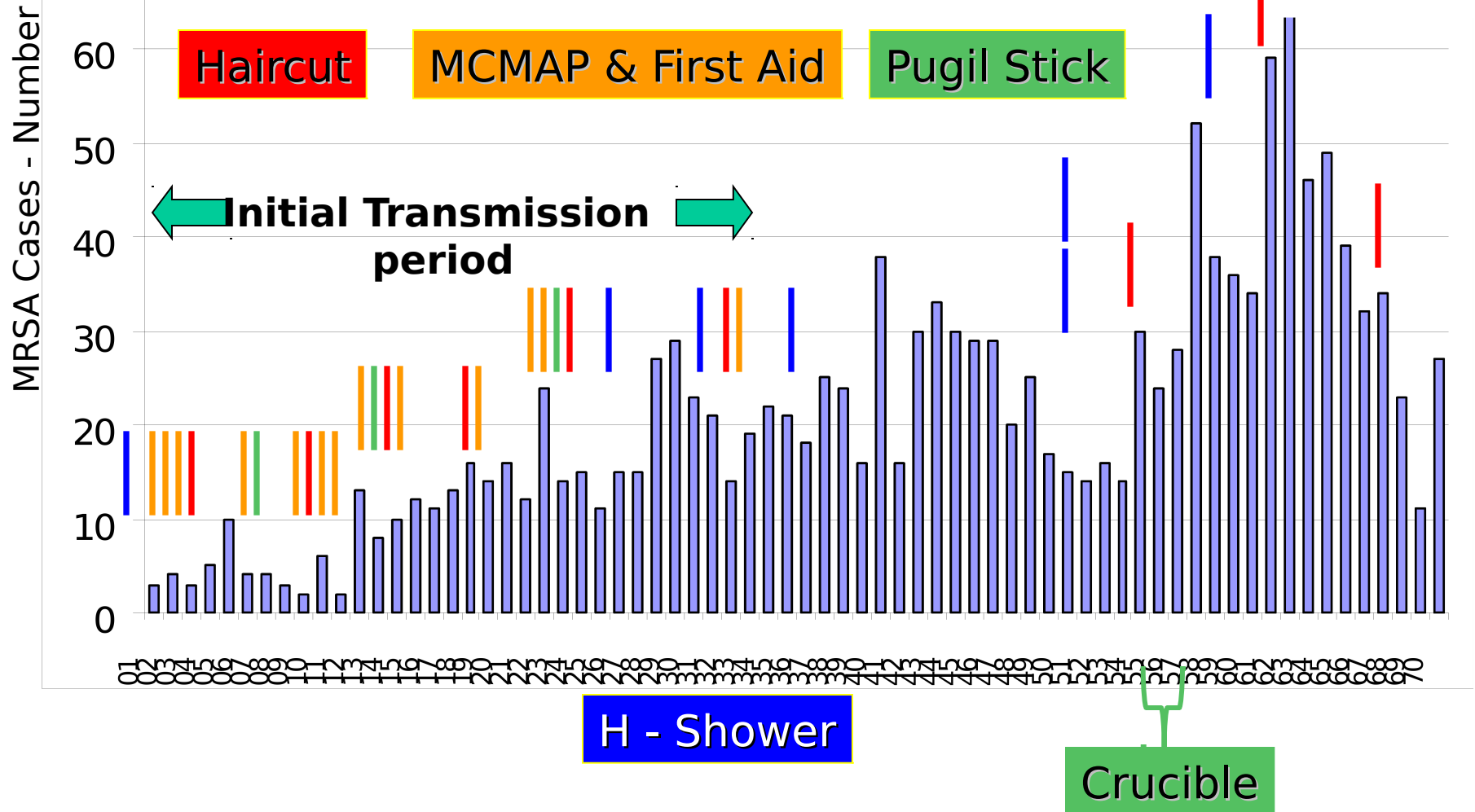
NEPMU-2 Preventive Recommendations

- **New Policy**
 - RTR CMDR issued a written order to ensure showers were of an adequate duration.
- **Improved medical practice**
 - Avoid B-lactam empiric treatment.
 - Use Rifampin 600 mg QD X14d, Minocin 100mg BID X14 days, Mupirocin 2% X5d and hibiclense washings.
 - Culture all infection and ensure adequate wound treatment and care
- **Prophylaxis for clusters >2% of unit affected...**
 - Mupirocin 2% BID X5D with Hibiclense washes.
- **Hygiene**
 - Antibacterial soaps and hand sanitizers were placed in all recruit heads.
 - Investigators recommended that recruits wash their hands as frequently as possible.

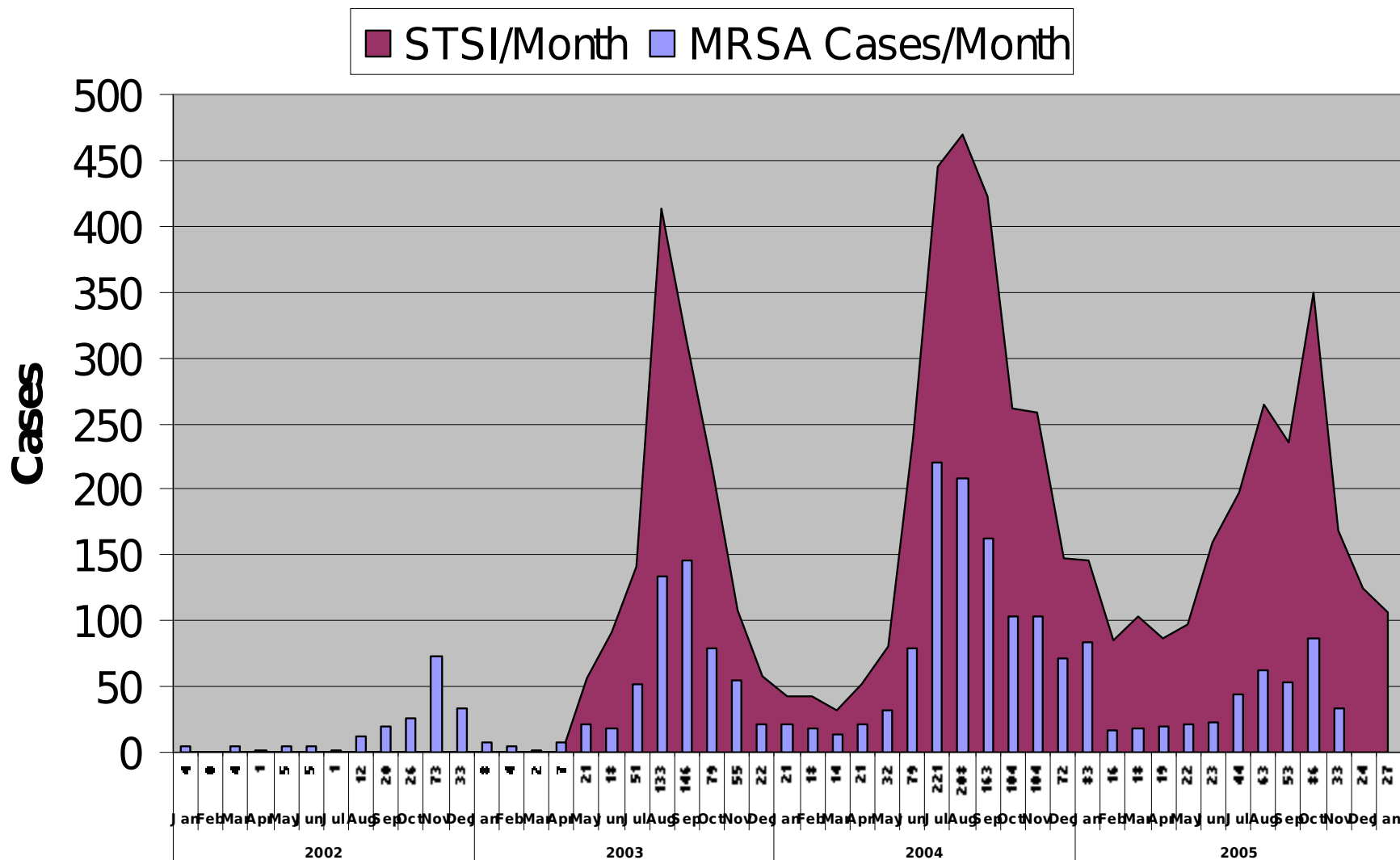
NEPMU-2 Preventive Recommendations

- **Hygiene recommendations**
 - Recruits to purchase personal bottles of hand sanitizer.
 - Sharing of personnel items was prohibited.
- **Disease Surveillance**

MRSA Cases by training day and directed contact with another recruit(s) or common fomite



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MRSA Case Numbers

- May-Nov MRSA recruit cases:
 - 2002: 235 cases
 - 2003: 512 cases
 - 2004: 911 cases
 - 2005: 324
- Dec-Apr MRSA cases also increasing:
 - 2002: 9 cases
 - 2003: 54 cases
 - 2004: 96 cases
 - 2005: 201* cases

The Cost

	2002	2003	2004	2005	2005 Expected
Total cases to date	184	538	1057	484	1150
Avg. Clinic Visits per case	2.258	2.258	2.258	2.258	2.258
Total est. visits	415.472	1214.804	2386.706	1092.872	2596.7
Hours per visit	3	3	3	3	3
Total lost hours	1246.416	3644.412	7160.118	3278.616	7790.1
Lost Training Days	52	152	298	137	325
LTD /month	4.33	12.65	24.86	11.38	27.05
Cost per visit	\$45.00	\$45.00	\$45.00	\$45.00	\$45.00
Visit costs	\$18,696.24	\$54,666.18	\$107,401.77	\$49,179.24	\$116,851.50
Hospitalizations	37	39	55	37	77
Hospitalizations/case	0.20	0.07	0.05	0.08	0.07
Cost per hospitalization	\$3,600.00	\$3,600.00	\$3,600.00	\$3,600.00	\$3,600.00
Hospitalization costs	\$133,200.00	\$140,400.00	\$198,000.00	\$133,200.00	\$277,200.00
Annual Costs	\$151,896.24	\$195,066.18	\$305,401.77	\$182,379.24	\$394,051.50
Running Total	\$37.00	\$346,962.42	\$652,364.19	\$834,743.43	